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25X1

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25X1

Copy No. a of a - e

January 7, 1971

To: John C.

From: [redacted] 25X1

Subject: Technical Progress Report No. 8
Contract No. [redacted] 25X1

Reference: [redacted] 2201201-TPR-8 25X1

This is the eighth monthly technical progress report on 25X1
Contract No. [redacted] covering the program effort from 20 November to 24 December, 1970.

A briefing was given 16 December at the customer's facility and examples of the micro and macro optical manipulation work 25X1
conducted at [redacted] presented. Results obtained on operational imagery at the customer's facility were also presented. These results demonstrated the increased information extraction capability made possible by optical image manipulation. Degradations resulting from defocus and linear image motion were removed using complex spatial filters and the contrast of low contrast imagery increased using amplitude filters, allowing the observation of detail that was previously below the visual threshold.

During this month an evaluation of the low frequency vacuum evaporated filters, purchased for the microscope system; was conducted. These filters resulted in a substantial noise reduction relative to their photographic counterparts, allowing "cleaner" output imagery to be obtained. Excellent results were obtained with the 2X and 4X microscope objectives while the sizes proved to be

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inappropriate for the 10X objective and additional filters have been ordered, for use with the 10X objective, and scaled on the basis of the successful results obtained for the other objectives. Evaluation of the filters included the determination of the proper degree of coherence for their use as well as determining their optimum size and transmission.

During the coming month we will be implementing the use of complex filters on the microscope system extending its capabilities to complex spatial filtering. The possibilities of using the phase relief image in optical image manipulation will also be studied both analytically and experimentally.

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Student's Name SECRET Date

Subject Instructor's Name

We find that the output is sensitive to the source optics configuration.

1. When the source image is soft the frequency response variations are also soft — resulting from the convolution of source image and filter. Then the output image contrast varies softly as in incoherent systems or those with small amounts of coherence.

2. When the source image is sharp the frequency response also varies more sharply, and output contrast more significant. We find that this latter requirement is important.

e.g. Source

(1.)

Filter

Env.

(2.)

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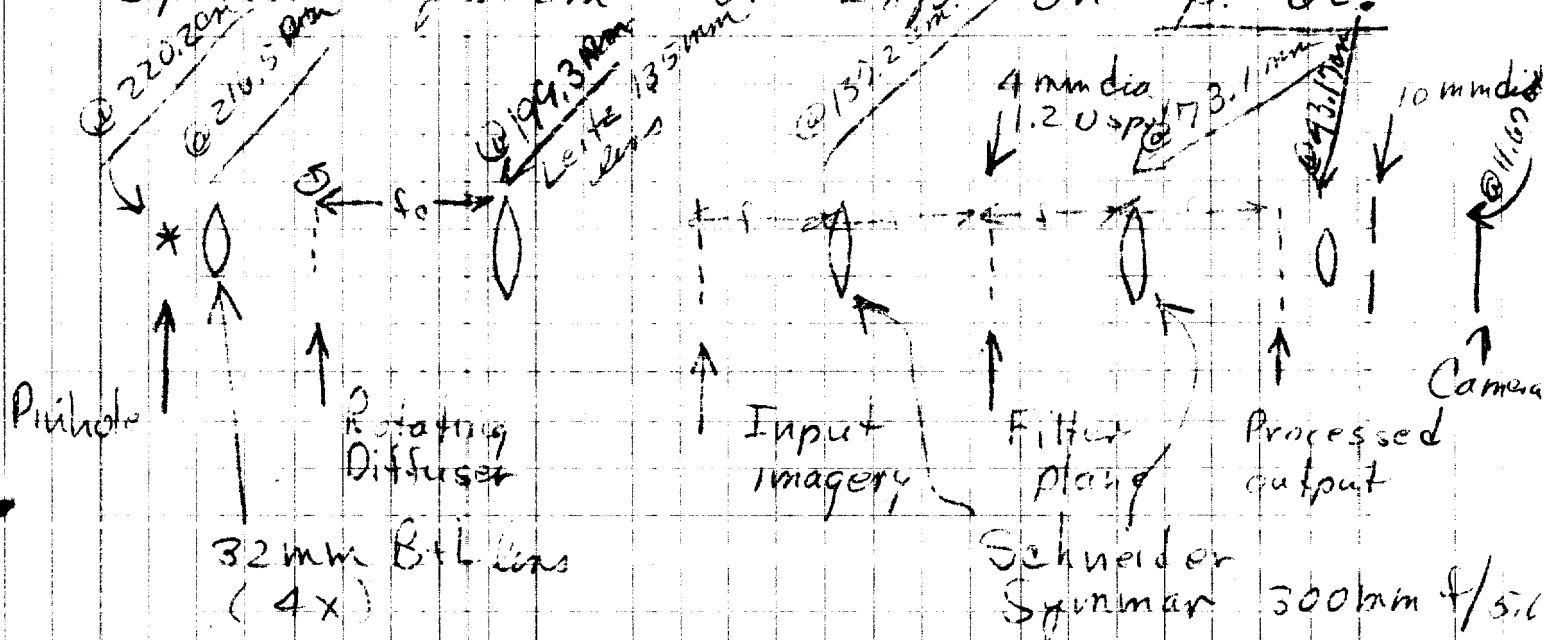
Optical System for Exp. on p. 62.



We find that the quality of the output is dependent on the scatter configuration as discussed on p. 63.

Results of Roll 1 OP #1

Information is obvious on the Processed output. It is also obvious in the print. We will now return to the experiment take further exposures at the present set-up and also modify the source to see if further improvement is available.

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Student's Name Date

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for Roll 1

1. Call at 200 cm 199.3 cm
Source ca. 3 mm dia.
results as photog.

2. Call @ 200 cm source at 216.30 cm

3. " 201 " 216.06 "

4. " 198.5 " 215.67 "

5 " 197.22 " 215.67 " (best of above)

6. " 197 " 215.75 "

Roll 2 OP#1
at position 5 above for diffuser + Coch.
focus at 16, aperture 1/2, 1, 2, 4, 8 sec.

Roll 3 OP#1
a) smaller source map (pos'n as for Roll 2)
1/2, 1, 2, 4, 8 sec.

b) Call @ 198 cm 1/2, 1, 2, 4, 8 sec
source @ 215.75

Dec 2, 1970

Analysis of other dupe copies as
possible candidates for image
manipulation.

Results: Roll 2 - not as sharp as Roll 1 as
exposed but other info appears to be coming
up — that in shadow — that at bottom.

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DP #4

A dense DP to see if info. exists in dense area of negative.

Roll 1 ½ sec, 1, 2, 4, 8, 16, 32, 64 sec. Image @ 215.63 C-41 @ 197.2

Visually it appears that something is there.

Result:

Nothing conclusive about the output. The initial info. not apparent — appears as if would also require forced with input change.

Serious of O.P.

~~DP #1~~ DP #2 showed some info — but not clear. visually

DP #3 — print shows some info. not as clear as DP #1 but outlines obvious — second, partial.

Note —

Talked with John C. to reproduce Dec. 7, 1970 other dupe pro. $\delta > 1$ (about 1.3 to 1.4) ⅓ stop exposure steps from low to high exposures.

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Student's Name Date 6 Dec, 1928 07

Subject SECRET Instructor's Name

How to DP #3 result and test it can be improved on.

25X1 [redacted] at last

1. Dupes reviewed :- discovered that we were using 2420 DP rather than 2430. Quality & contrast not as good as DP #1. The 2430 is very grainy.
2. Dupe #3 — ran through system but not approved evidently the original is very thin — on 2430
3. Dupe #4 — on 2420 - grainier — although much the lighter appears and the second blacker. Same characteristics.
4. Dupe #2 — 2430 — not a good dupe — the darker shows opacity
5. Dupe #2 — on 2430 — comes right out — Calculation lens pos'n 199.55 a.m. Microscope pos'n 215.55 a.m. Source image just slightly less than filter.
6. Request more dupes made because previous were on 2420.
7. Proof this set — looks good!!! Placed in system. (They were lying about Proc on Allegheny 13, Negs rejected)

Roll 1 Dup Focus A (16) ½

B (20) ½ 1 2 4 "

C (12) ½ 1 2 4 "

This dupe card Chemistry is lighter than Gordon test on this of 215.2 pos'n on Microscope lens. Calc 199.22

Soft skirts larger than filter.

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Student's Name [redacted] Date

Subject SECRET Instruc

Roll 2 Microscope lens @ 215.53 cm
Cell @ 199.24 cm
Spot slightly less than before.

[redacted]

Dec 8, 1970

Roll 3 Spot slightly less than before, but still much
on film. Optimum exposure 6 seconds.
Same microscope position & illuminating
lens position.

Dec 9, 1970

Roll 1 OP #5

Focus pc Wings @ 26, 2 pc Rings @ 1, 2, 9, 8, 14 pc
50 "
34 "
38 "

Roll 2 →

Results: Very low origination film
overloaded image — support
the previous type test done?
Rejected at this time — film
disregarded because it does not
add to previous results.

Roll 3

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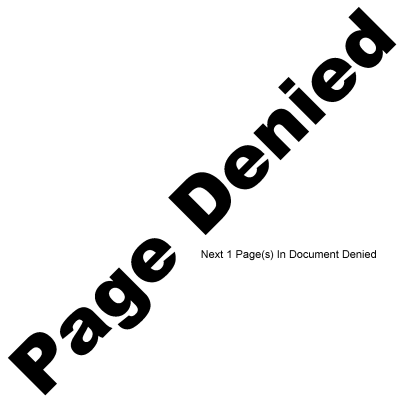

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